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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,089	08/01/2003	Olav Tirkkonen	59643-00238	3395

32294 7590 12/09/2005

SQUIRE, SANDERS & DEMPSEY L.L.P.  
14TH FLOOR  
8000 TOWERS CRESCENT  
TYSONS CORNER, VA 22182

EXAMINER

NGUYEN, DUC M

ART UNIT PAPER NUMBER

2685

DATE MAILED: 12/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/632,089	TIRKKONEN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Duc M. Nguyen	2685	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Information Disclosure Statement*

1. The references listed in the information disclosure statements submitted on 10/26/04 has been considered by the examiner (see attached PTO-1449).

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –  
(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims **1, 18, 23** are rejected under 35 U.S.C. 102(a) as being anticipated by **Sadjadpour et al** (US 2001/0055332).

Regarding claim **1**, **Sadjadpour** discloses a communication system for transferring data between a transmitter and a receiver over a plurality of channels, the communication system comprising:

- modulation circuitry having a plurality of modulation alphabets providing a set of bit loading sequences (see [0027]);
- circuitry for determining a power allocation for at least one bit loading sequence based on minimizing an error rate (see Fig. 6, ref. 62 and [0038], [0043], [0044]);
- and
- circuitry for selecting a bit loading sequence with a lowest error rate (see [0044] regarding maximize data rate and minimize BER).

Regarding claims **18, 23**, the claims are rejected for the same reason as set forth in claim 1 above.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims **2-13, 19-20, 22** are rejected under 35 U.S.C. 103(a) as being unpatentable by **Sadjadpour** in view of Applicant's admitted prior art (Fig. 1-2 and [0005]-[0023]), hereafter, AAPA.

Regarding claim **2**, **Sadjadpour** discloses all the claimed limitations, see claims 1 above, except for a MIMO system. However, one skilled in the art would recognize that the method as taught by Sadjadpour would be applicable to the MIMO system and would work equally well. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate Sadjadpour's teaching to the MIMO system in AAPA as well, for providing a MIMO system as claimed, for optimizing bit and power allocation in MIMO communication systems.

Regarding claims **3-4, 9, 11-13**, the claims are rejected for the same reason as set forth in claim 2 above. In addition, it is clear that Sadjadpour as modified would

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disclose power weighting and plurality of antennas and OFDM channels as claimed (see AAPA, [0008]-[0018], and Sadjadpour, [0033]).

Regarding claims **5-6**, the claims are rejected for the same reason as set forth in claim 2 above. In addition, **Sadjadpour** would disclose a “fixed” data rate as claimed (see Sadjadpour, [0038]-[0039] regarding a “desired” data rate).

Regarding claims **7-8**, the claims are rejected for the same reason as set forth in claim 2 above. In addition, **Sadjadpour** discloses a channel quality is measured at the transmitter and receiver as claimed (see Sadjadpour [0029] regarding noise PSD).

Regarding claim **10**, the claim is rejected for the same reason as set forth in claim 9 above. In addition, since one skilled in the art would recognize the need of increasing transmission power for weak channels in order to satisfy a minimum signal-to-noise ratio requirement for transmission, it would have been obvious to one skilled in the art at the time the invention was made to modify **Sadjadpour** for allocating greater power weighing to weaker channels as claimed, in order to meet a minimum channel quality requirement for transmission.

Regarding claims **19-20, 22**, the claims are interpreted and rejected for the same reason as set forth in claim 3 above.

6. Claims **14-17, 21** are rejected under 35 U.S.C. 103(a) as being unpatentable by **Sadjadpour** in view of AAPA and further in view of **Kim et al** (2003/0128769).

Regarding claim **14**, the claim is rejected for the same reason as set forth in claim 1 above. In addition, since codings and modulations that utilize system bits and

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parity bits are known in the art as disclosed by **Kim** (see Fig. 3 and [0076], [0077]), it would have been obvious to one skilled in the art at the time the invention was made to incorporate Kim's teaching to **Sadjadpour** for coding data into a plurality of modulation schemes utilizing system bits and parity bits as claimed, in order to provide a suitable modulation and coding scheme in accordance with the channel quality condition (Kim's motivation).

Regarding claim **15**, the claim is rejected for the same reason as set forth in claim 14 above. In addition, **Sadjadpour** as modified would disclose the parity bits are transferred on a weak channel (see **Kim**, [0104]).

Regarding claim **16**, the claim is rejected for the same reason as set forth in claim 15 above. In addition, **Sadjadpour** as modified would disclose the parity bits are transferred on a weak channel (see **Kim**, [0104]) and the power allocation is reduced (see **Kim**, [0098] regarding more transmission power to a good channel).

Regarding claim **17**, the claim is rejected for the same reason as set forth in claim 15 above. In addition, as disclosed by **Kim**, a modulation scheme for a good channel condition would either comprise only systematic bits or a combination of systematic bits and parity bits (see Fig. 3, [0076], [0077]). Therefore, when a combination of systematic bits and parity bits is used for interleavers, the parity bits would be transferred in a least significant bits as claimed (this is a common way for interleaving systematic bits and parity bits, wherein the systematic bits would be transferred in a most significant bits).

Regarding claim **21**, the claim is rejected for the same reason as set forth in claim 15 above.

***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

**Lee** (US 2003/0060173), Apparatus and method for transmitting and receiving data using an antenna array in a mobile communication system.

**Onggosanusi et al** (US 2002/0114269), Channel aware optimal space-time signaling for wireless communication over wideband multipath channels.

**Manninen** (US 2003/0091098), Partially filling block interleaver for a communication system.

**Medlock et al** (US 2002/0062472), Dynamically reconfigurable universal transmitter system.

**Balakrishnan et al** (US 6,925,131), Determining channel characteristics in a wireless communication system that uses multi-element antenna.

8. **Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

**or faxed to:**

(571) 273-8300 (for **formal** communications intended for entry)

(571)-273-7893 (for informal or **draft** communications).

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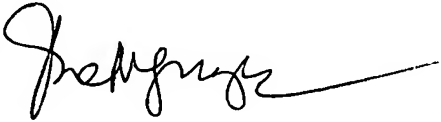
Hand-delivered responses should be brought to Customer Service Window,  
Randolph Building, 401 Dulany Street, Alexandria, VA 22314.

Any inquiry concerning this communication or communications from the examiner  
should be directed to Duc M. Nguyen whose telephone number is (571) 272-7893,  
Monday-Thursday (9:00 AM - 5:00 PM).

Or to Edward Urban (Supervisor) whose telephone number is (571) 272-7899.

Duc M. Nguyen, P. Ex.

Dec 8, 2005

A handwritten signature in black ink, appearing to read 'Duc M. Nguyen', with a long horizontal flourish extending to the right.